

those who wish to specialize in ophthalmology should be impressed with the necessity for obtaining sufficient instruction in physics and physiologic optics so that they shall be able intelligently to master refraction and motor anomalies. Too much time devoted to physics and physiologic optics has a tendency, however, to overemphasize the physical rather than the physiologic aspect of the subject; on the other hand, too little makes it exceedingly difficult to grasp. Unless the student approaches the subject in this way he soon becomes engrossed in the study of the diseases and surgery of the eye—fascinating branches of our work. I admit, but hardly remunerative enough to enable him to meet his obligations in his early years of practice unless he has a private income.

With regard to the attitude of the profession toward ophthalmologists, let me say that I believe our relationship could be very greatly improved by frank discussions. I have been impressed with the fact that the principal criticisms our colleagues have to make are against our refraction, and an expense to the patient greater than he can afford.

Ophthalmologists everywhere recognize that to a certain extent this first criticism is justified. However, through their own efforts and with the help of the American Board of Ophthalmic Examinations the standard of practice in ophthalmology has been very materially raised and it will not be long before this criticism will cease to be founded on fact. With regard to the criticism concerning the total expense for the examination and glasses, I have no hesitancy in making the statement that within certain limits this is not in accordance with the facts.

In every community there are an adequate number of young ophthalmologists well trained in refraction and motor anomalies who would be only too glad to charge a fee for their examination commensurate with the financial limitation of the patient, having in mind the probable total outlay which the patient will be called upon to make. Under these circumstances the patient's total bill will be no higher than were he to have had the examination made by a nonmedical refractionist.

But what is more to the point he would have had his eyes examined by a physician thoroughly trained in physiology, anatomy, pathology, neurology, and internal medicine in addition to a thorough training in the correction of errors in refraction and motor imbalance.

The public should be educated to the difference between the physician who specializes in ophthalmology and the nonmedical refractionist.

The medical profession must assume and discharge this responsibility to the best of its ability.

✱

**DOCTOR KELSEY (Closing).**—Those of us who have been initiated into the intricacies of ophthalmology, and have become acquainted with the intimate relationship existing between the eye and the rest of the body, need no further proof to convince us that refraction is a medical problem. On the other hand, it is not hard to understand how those who have not had the advantage of first-hand information on the subject, might hold refraction to be of only mechanical importance. Especially is this true since there has been so much misinformation and so little real information concerning refraction available to the average person. For many years the public has been the recipient of a large amount of commercialized discussion of the subject, while the professional aspect has been characterized, in most part, by a dignified silence.

In view of these facts, if any layman should arrive at an erroneous conclusion relative to refraction, he scarcely can be blamed. It would appear, then, to be the duty of ophthalmologists to use every legitimate means at their command in an attempt to acquaint the public with the difference between a medical and a nonmedical examination and refraction.

## CALCIUM THERAPY IN UROLOGY\*

By HENRY A. R. KREUTZMANN, M. D.  
San Francisco

DISCUSSION by Franklin Farman, M.D., Los Angeles;  
Miley B. Wesson, M.D., San Francisco; Albert M. Meads,  
M.D., Oakland.

THE importance of calcium as an essential constituent of the body and its value as a therapeutic agent has been recognized for only a comparatively short time. Particularly is this true in the field of urology, where its administration is of benefit in a number of unrelated pathologic conditions. Because there has been so much divergence in the results of experimental work on calcium and such discrepancy in the results obtained clinically, it is possible that few physicians have recognized the value of this drug in the field of medicine. Even at the present time, investigators are not in accord as to the amount of calcium normally present in the blood. The limits range from 8.8 milligrams per 100 cubic centimeters as determined by Jones, to 12.46 milligrams according to Lyman. The normal appears to be between nine and eleven milligrams per 100 cubic centimeters of blood.

### METHODS OF ADMINISTRATION

Calcium may be given either orally, intravenously, or intramuscularly.

**Oral Administration.**—Most of the salts have a disagreeable taste and when given orally in sufficient amounts to be of benefit are irritating to the gastro-intestinal tract. For these reasons calcium lactate is most often used, although it possesses a lower calcium content. Recently calcium gluconate has been developed by Sandos. It is tasteless, comparatively nonirritating, and has been shown by Rothlin to be physiologically and pharmacologically equal to calcium chlorid. Cantarow believes it to be the most satisfactory product for routine use. The dose of calcium gluconate is sixty grains three or four times a day. The best time for administration is half an hour before meals or four hours after meals, when the alkalinity of the upper intestinal tract is lowest. With this dosage the serum calcium rises two to four milligrams above normal in one to two hours. It will remain above normal for six to eight hours.

**Intravenous Administration.**—For this purpose the chlorid or gluconate salts are most commonly used. The latter has the advantage of causing no irritation if accidentally injected into the tissues about the vein. The dose is 10 cubic centimeters of a 10 per cent solution of the chlorid and 10 to 20 cubic centimeters of a 10 per cent solution of the gluconate. The injection should be made slowly, as the patient will experience a severe burning sensation over the skin of the entire body, with some dyspnea. An increase of 80 to 100 per cent in the serum calcium concentration occurs within five minutes. The preinjection level is usu-

\*Read before the Urology Section of the California Medical Association at the sixty-first annual session, Pasadena, May 2-5, 1932.

ally regained within two hours. Because of the rapidity of elimination the intravenous injection may be given several times a day without any harmful effects.

*Intramuscular Administration.*—Calcium gluconate is the only salt which will not produce any inflammatory reaction when given intramuscularly. The dose is 10 cubic centimeters of a 10 per cent solution. Observation shows a rise in the serum calcium within twenty minutes, gradually declining and reaching normal within six to eight hours.

#### THERAPEUTIC INDICATIONS

The various urological conditions in which we have used calcium with benefit are: acute epididymitis, acute salpingitis, incrustated cystitis, hemorrhage, and ureteral calculi.

#### ACUTE EPIDIDYMITIS

Gonorrheal infection of the epididymis was benefited by the use of calcium salts when the patients were seen at the onset of involvement. The earlier the treatment is begun the greater is the chance of aborting this condition. Our method has been to give an intravenous injection as soon as the diagnosis is made, followed in two hours by an intramuscular injection. The intramuscular injections are repeated every eight hours. If there is no improvement in two days this type of medication is stopped. Of course it is understood that, along with the calcium, other measures which have a definite value, such as support and heat, are also used. In a series of eighteen cases there was definite relief in seven. By relief is meant a decrease in the size of the testicle with freedom from pain. We feel that calcium therapy was of benefit, because the epididymis in each of these instances did not reach an extreme stage of swelling and subsided more rapidly than is usually the case.

#### ACUTE SALPINGITIS

Having obtained some success in the treatment of acute gonorrheal epididymitis, it was thought that the same may hold true for acute gonorrheal salpingitis. In this condition the diagnosis was never made as soon as in epididymitis. Most women do not remark about a vague lower abdominal pain. It is not until severe inflammation with pus formation has occurred that the diagnosis is made. For that reason in a series of twelve cases only two obtained any relief from pain. In these two patients, although the course of infection was greatly moderated, bimanual palpation showed the tubes to be thickened and tender to palpation.

In what way calcium acts in these acute infections is not definitely known. It may be due to marked leukocytosis, as Hamberger observed that calcium increases the ameboid movement of the phagocytes.

#### INCRUSTED CYSTITIS

Although calcium salts are not used directly, it appears that calcium metabolism in some way affects this condition. By using parathyroid ex-

tract the calcium content of the blood is increased. For some reason as yet unknown, this has a beneficial action in patients with incrustated cystitis. Redewell reports improvement also in leukoplakia and malakoplakia.

#### REPORT OF CASE

At present we have one patient in whom repair of a vesicovaginal fistula had been attempted four times, each time unsuccessfully. At last, closure had been effected years ago by closing the outlet of the vagina and incorporating this structure with the bladder. When seen in June, 1930, she complained of frequency, nocturia, and dysuria. The urine had the typical foul odor of an alkaline cystitis. Cystoscopy showed the whole surface of the artificial bladder, which did not contain normal mucous membrane, to be covered with grayish deposits of urinary salts. After two months of unsuccessful local treatments the incrustations were removed with a curette. Lactic acid was instilled into the bladder at intervals for two months. For the past fifteen months the only medication the patient has received has been occasional doses of parathyroid extract. At the present time she is free of all symptoms, the urine is normal, and there has been no redeposit of urinary salts. Just how much benefit has been derived from the parathyroid medication it is difficult to say. It must have some value, as a raw surface such as is present in this patient is certainly a fertile field for the deposit of urinary salts.

#### HEMORRHAGE

Since Wright first advocated calcium salts they have been used extensively for many different types of hemorrhage. Different authors claim varying results for the same condition. At present, however, it appears doubtful that any marked decrease in coagulation time can be obtained when calcium salts are given by mouth. To be of value they must be given either intravenously or intramuscularly. It has been shown that a single injection may result in a decrease in clotting time and a lessening in the tendency to bleed; whereas the prolonged maintenance of an elevated blood-calcium level will cause a secondary increase in coagulation time with greater bleeding. Calcium is of most value in the slow, oozing types of hemorrhage. Its use has been advocated in malignancy of the bladder and in hemorrhage following prostatectomy.

As a precautionary measure our prostatectomy patients receive an intramuscular injection of calcium gluconate one hour before going to surgery. This is repeated in eight hours if the bleeding appears excessive.

In cases of carcinoma of the bladder we have had no result, but have had to rely on other drugs to control the bleeding.

#### URETERAL CALCULI

Aub was one of the first to recognize the benefit of calcium chlorid to relieve colic of ureteral or renal origin. More recently Bauer, Salter, and Aub reemphasized this fact. During the past eight months we have given calcium chlorid intravenously to thirty-two patients suffering from ureteral calculi. Some of them were treated during an attack of colic, whereas in others the stone was quiescent. Relief from pain was obtained in all but six cases. In nine of the remaining twenty-

six cases the stone was passed without further cystoscopic manipulations. It is remarkable how quickly the pain will disappear after the injection. In some instances it was necessary to repeat the injections in several hours and again there was relief from pain. One patient who obtained no relief from large doses of morphin was freed from pain by the administration of calcium chlorid.

The most striking case in the series was that of a man of fifty-seven who had a left nephrectomy fifteen years previous for pyonephrosis with calculi. Three weeks before examination he had an attack of ureteral colic on the right side. X-rays showed two stones in the right ureter. On two different occasions it was impossible to pass a catheter or the smallest filiform beyond the stones, which were impacted 20 centimeters from the bladder. He was given one injection of calcium chlorid. The next afternoon he had a mild attack of colic which lasted two hours. Following the attack he recovered one stone. On taking an x-ray it was seen that the other stone had also been passed. It was then possible to insert a No. 6 whistle-tip catheter into the kidney pelvis without difficulty.

Just what the action of calcium is in these cases has not been demonstrated. Calcium is known to decrease the irritability of unstriated muscle. Perhaps it is this action which causes a relaxation of the spasm produced by the calculus and permits the stone to pass on. With this thought in mind we gave calcium intravenously to a number of patients who had severe pain following complete kidney investigation. This was done in the hope of decreasing the colic. In not one instance, however, was there any relief or diminution in the pain. This shows that the colic of a ureteral stone is not similar to that produced by ureteral catheterization.

#### CONCLUSIONS

Calcium is of benefit in cases of acute epididymitis, acute salpingitis, incruled cystitis, prostatic hemorrhage, and ureteral calculi.

Calcium gluconate is the most satisfactory salt for routine use. This drug is best administered either intramuscularly or intravenously. When given intravenously it may be repeated in several hours without any ill effect.

2000 Van Ness Avenue.

#### DISCUSSION

FRANKLIN FARMAN, M. D. (727 West Seventh Street, Los Angeles).—Calcium therapy is a very interesting subject and the amount of literature on the topic indicates the wide appeal it has made to physicians in treating disease. We are fortunate in having the record of Doctor Kreutzmann's experience presented here today as very few of us are making sufficient use of this valuable mineral agent.

The calcium salts, mainly the chlorids, gluconates and lactates, are well adapted to the relief of inflammatory conditions, especially in the acute stage, and it is a well established fact that they act, by stimulating phagocytosis, by decreasing exudative processes (outpouring of serum and reducing cell permeability), and by moderating nerve and muscle tissue irritability, thereby relieving pain and spasm. (This is the desired effect of the intravenous injection of calcium in cases of ureteral colic.)

Calcium is valuable in checking hemorrhage, especially of the capillary, oozing type which is frequent in inflamed parts, such as in inflammation associated with hypertrophy of the prostate. The presence of calcium is necessary for the proper reaction between thrombokinase and thrombogen.

In my own practice I have made use of the calcium salts (lactate, gluconate, carbonate, chlorid) usually in combination with sodium bicarbonate and magnesium salts as preliminary medication for prostatectomy and as accessory treatment in some cases of acute pyelitis and pyelonephritis. The use of the calcium salts alone, or in combination, given per mouth in sufficient dosage will increase the urinary output and aid in restoring the normal blood chemistry levels. The claim that the calcium salts are not well absorbed from the intestinal tract has been amply disproved by Baráth and the Pavlov school.

In conclusion, it may be said that calcium is present in all the tissues of the body and is a necessary physiological salt. The metabolism of calcium is in some manner intimately related to and dependent upon the secretion of the parathyroid gland and vitamin D. To a lesser degree it is allied with the activity of the anterior lobe of the pituitary gland.



MILEY B. WESSON, M. D. (490 Post Street, San Francisco).—Doctor Kreutzmann's paper should be of particular interest to us, as the first man in the United States to use calcium therapy in urology was a member of this section.

Calcium chlorid intravenously has long been used in the treatment of paralysis agitans, tetany, epilepsy, chorea, chronic ulcerative toxemias, and slow coagulative hemorrhages. In studying the function of the calcium ion in the human body, scientists concluded that it (1) materially increased phagocytosis, (2) reduced inflammation of the tissues, and (3) increased tissue resistance against bacteria invasion.

E. Radnai of Budapest in 1922 reported that its use in two cases of epididymitis resulted in cessation of pain within a few hours and the disappearance of swelling within a few days. Dr. Alvin E. Cerf of San Francisco tried it on a series of seventeen ambulatory cases of gonorrheal epididymitis and in 1924 reported his results in the *Therapeutic Gazette*. The article apparently escaped general notice, for Campbell in 1927, in a review of three thousand cases treated at Bellevue Hospital, did not mention the use of calcium chlorid, nor did Wolbarst in 1927, nor Pelouze in 1928, in their books on gonococcus urethritis in the male. Livermore in 1929 in his book on gonorrhea reports that the use of calcium chlorid in his hand was disappointing. However, he used ten cubic centimeters of a one per cent solution, whereas Cerf advised ten cubic centimeters of a ten per cent solution.

Calcium chlorid is objectionable because of its extremely irritant effect. Immediately after the beginning of the injection there is a severe burning at the base of the tongue and then a wave of heat passes over the entire body, and this often persists for ten or fifteen minutes. Occasionally there is nausea, and again, rather severe shock and cyanosis. I had one patient who went into temporary coma, with a marked dilatation of the pupils and cessation of respiration for about a minute.

Several years ago calcium gluconate was offered to the profession. It is much better tolerated, is less toxic, and the only disagreeable effect is a temporary burning at the base of the tongue. Recently calcium glucose has appeared and is reputed to be more efficacious and less toxic than is calcium gluconate.

Calcium gluconate can be given by mouth, intravenously, and intramuscularly. It is tasteless, and for conditions where a mild and constant calcium effect is desired it may be given by mouth in doses of sixty grains three or four times a day—preferably after meals as there is then greater absorption and a more persistent effect. Excessively large doses diminish the

amount of absorption by producing a diarrhea. Following oral administration, the blood serum calcium reaches a maximum in about an hour and remains high for about eight hours. The findings after intramuscular injections are practically the same, the maximum being reached in about one-half hour, and the rise persists for the same length of time as after oral administration. Hence, since the oral administration is just as effective as the intramuscular and avoids traumatism of tissues there is no justification for intramuscular injections. The fast method is the intravenous; the blood serum calcium reaches a maximum at once and falls to normal in two hours. The drug goes into the tissues and is there available as a protective factor.

The literature is beginning to be filled with enthusiastic reports of the effect of the use of calcium salts. Personally, for the past seven years I have used calcium chlorid or calcium gluconate empirically as a prophylactic in all cases of vasitis and epididymitis, and occasionally following urethral instrumentation.

I at least did the patients no harm. I may have aborted or cut short some of my cases. I do not know as I also used the other recognized forms of therapy. I have repeatedly given daily injections for two or three weeks for a tender globus minor. The epididymitis in most cases did not progress, neither did it suddenly subside and become painless as others report. Doctor Kreutzmann's results in the cases of renal colic are most interesting and instructive.

\*

ALBERT M. MEADS, M. D., (251 Moss Avenue, Oakland).—In a specialty where we tend to think in terms of surgery and active instrumental treatment, Doctor Kreutzmann's paper on calcium therapy is particularly welcome as it calls our attention once more to the possibilities of another means of treating certain symptoms that demand relief. I am one, at least, who has neglected the possibilities of calcium therapy as outlined in this instructive paper, as I have limited myself largely to the older methods of treatment, leaving calcium primarily for the treatment of hemorrhage or potential bleeders.

We have used calcium gluconate intravenously, but not frequently enough to draw any conclusions. The disagreeable sensation following immediately after its injection passes off within a few minutes, so that it seems to us the best drug for all around use, especially in the office. Although there is a question in the minds of some as to the efficacy of calcium in some of the diseases mentioned, this paper will have done much if it will make us keep calcium therapy in mind and give it a fair trial before condemning it.

## CHRONIC PURULENT OTITIS MEDIA\*

ITS TREATMENT WITH IODIN POWDER  
(SULZBERGER)

By RUSSELL FLETCHER, M. D.  
San Francisco

DISCUSSION by J. D. Lewis, M. D., Santa Barbara; Frank A. Burton, M. D., San Diego; Robert C. Martin, M. D., San Francisco.

IN the June 1930 *Laryngoscope* Dr. M. D. Lederman of New York<sup>1</sup> wrote about his very satisfactory results in the treatment of chronic purulent otitis media with iodine powder. We have been using this form of treatment ever since and have had excellent results. In fact we are convinced, after using it in more than seventy-five patients, that it is the best aid in the treatment of

these conditions at the present time. As there has been very little written on this subject other than articles by Doctor Lederman, and as it does not seem to be well known among many otologists, we felt that it was advisable to give this report.

Doctor Lederman's first article appeared in the November 1917 *Laryngoscope*.<sup>2</sup> In 1930 he said: "Since employing it I have not been obliged to resort to radical surgery in any case lacking indicative symptoms, no matter how chronic. Indications for such intervention must be distinct and urgent before resorting to such a drastic measure, with its attendant possibility of great loss in auditory function." Our experience has been very similar to Doctor Lederman's.

### IODIN POWDER (SULZBERGER)

The following is a brief description of the iodine powder (Sulzberger). "It is an intimate association of iodine with boric acid, prepared by mixing iodine solution with dry, finely powdered boric acid and evaporating the solvent so that free iodine is deposited on the powder and not in chemical combination. The action is due to the iodine, which, as the boric acid dissolves in the secretions, is liberated and penetrates deeply into the tissues. Due to the solubility of the boric acid in the secretions, it is completely dissolved in forty-eight hours and does not cake, which is a very valuable quality."

There have been several imitations or substitutes put on the market. We have not tried any of these because the original powder is very inexpensive.

### TECHNIQUE OF TREATMENT

The technique of this treatment is extremely important. It could be described in one sentence: Thoroughly clean and dry the middle ear, and insufflate iodine powder. However, as the keynote to the success of the treatment is the very thorough cleaning of the entire middle ear cavity and its recesses, the above statement needs amplification. The longer we have used this treatment the more firmly we are convinced that its success is due, in a large part, to the very thorough cleaning of the middle ear cavity before insufflating the iodine powder. We believe the reason that a few otologists have not obtained good results has been because they did not realize the importance of thorough cleaning. We know that the very painstaking and thorough elimination of pus, debris, and mucus as demonstrated by Doctor Lederman would have cleared up certain failures previously treated, without the added use of the iodine powder.

"Irrigations are forbidden," according to Doctor Lederman, but we have used them occasionally to mechanically clean out the attic cavities or other inaccessible recesses. These irrigations were always followed by thorough drying. Granulation tissue and polypi are removed. All gross debris and pus is removed as completely as possible. This is most easily and efficiently accomplished with fine glass or metal suction tips. An excellent metal suction tip is easily made from an old hypodermic needle three inches long and sixteen to eighteen gauge. This is about the same size needle that is

\* Read before the Eye, Ear, Nose and Throat Section of the California Medical Association at the sixty-first annual session, Pasadena, May 2-5, 1932.